Day-Length During Seed Development Affects Size, Germinability and Storability of Lettuce Seeds.

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Seed quality is determined in part by the environment under which the seeds are produced. The objective of this study was to determine how day-length of the mother plant environment affects lettuce seed quality. Seeds of cv. Tango were produced in growth chambers under one of two treatments: i) short day (SD), consisting of 8 h of fluorescent light (~310 $\mu mol \cdot m^{-2} \cdot s^{-1}$) plus 16 h of darkness daily, and ii) long day (LD), consisting of 8 h of fluorescent light plus 8 h of incandescent light (~21 $\mu mol \cdot m^{-2} \cdot s^{-1}$) and 8 h of darkness daily. In both treatments the temperature was 23°C, constant. The LD treatment produced significantly heavier seeds, however germination at optimal conditions (20°C-light) was similar for both treatments. At suboptimal conditions (30°C, 20°C with different external ABA concentrations, or dark), seed germinability (% and rates) from SD treatment was higher. After accelerated aging (41°C, ~100%RH, 72 h) germination of normal seedlings was higher for seeds from LD. Seed germination was also evaluated after 2, 4, and 6 months of storage at 30°C, 74% RH. Stored seed presented a progressive and significant reduction of germinability for both treatments, however seeds from SD were more affected. The results indicated that day-length during seed development affected lettuce seed weight, germinability, and storability. In this case, germinability and storability were inversely related. The critical moment for day-length effects was also studied. Seed size showed to be determined earlier during seed development (first 6 days). Conversely, seed germinability and storability were determined at the end of seed development, after physiological maturity, which occurred ~11 days after flowering. Possible mechanisms involved in these effects will be discussed.